

REMARKS

Claim Objections

The Examiner has objected to claim 3 for containing an informality. Specifically, the Examiner has requested that claim 3 states before ENIG the full term "Electroless Immersion/Nickel Gold". Applicant has amended claim 3 accordingly.

Claim Rejections - 35 U.S.C. § 103

The Examiner has rejected claims 1, 3-10, 19 and 21-27 under 35 U.S.C. § 103(a) as being unpatentable over *Fukano* (U.S. Patent Number 5,986,348) in view of *Chan et al.* (U.S. Patent Number 4,983,804). The Examiner has rejected claims 2 and 20 under 35 U.S.C. § 103a as being unpatentable over *Fukano* in view of *Chan* as applied to claims 1, 3-10, 19 and 21-27, and further in view of *Admitted by Applicant Prior Art* (Background of the Invention Section). The Examiner has rejected claims 28 and 30 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fukano* in view of *Chan et al.* and further in view of *Dalal et al.* (U.S. Patent Number 6,618,267). The Examiner has rejected claim 29 under 35 U.S.C. 103(a) as being unpatentable over *Fukano*, in view of *Chan et al.*, in view of *Dalal et al.* and further in view of *Admitted by Applicant Prior Art* (Background of the Invention Section).

It is Applicants understanding that *Fukano* in view of *Chan et al.* fails to teach Applicant's invention as claimed in claims 1-10 and 18-30, Applicant claims a microelectronic assembly which includes a substrate having bonding pads disposed on a mounting surface thereof the bonding pads including a ferromagnetic material. The microelectronic assembly further includes a surface mount component bonded

to the substrate by the way of a solidified solder and including a magnetic layer disposed on a substrate side thereof. The magnetic layer of the surface mount component cooperates with the ferromagnetic material in the bonding pads of the substrate to establish a magnetic force of sufficient magnitude to hold the surface mount component on the substrate before and during soldering. That is, Applicant's claim a substrate having bonding pads with a ferromagnetic material and a surface mount component having a "*magnetic layer disposed on a substrate side thereof.*"

It is Applicants understanding that *Fukano* in view of *Chan et al.* fails to disclose a microelectronic assembly which includes a substrate having bonding pads with a ferromagnetic material and a surface mount component having a magnetic layer disposed on the substrate side thereof. Applicant understands *Fukano* as disclosing a chip 10 having bonding pads 12a-12l. Layered on top of the bonding pads 12a-12l is a first metal layer 18 and a second metal layer 20. On top of the second metal layer 20 is a ferromagnetic material 22. On top of the ferromagnetic material 22 is a wettable layer 24, such as gold. A solder bump is formed on the gold layer 24. A magnet 32 is placed over the solder bump 30 for a predetermined time until the ferromagnetic material 22 is fully magnetized. Once the ferromagnetic material 22 is magnetized, the chip 20 can be aligned with another device, such as chip 34 which includes a ferromagnetic material 38 associated with each solder bump. In this way, the ferromagnetic material 38 of the second chip is attracted to and aligned with the magnetized ferromagnetic material 22 of the first chip. Accordingly, *Fukano* discloses the use of a magnetized ferromagnetic material (38) and a ferromagnetic material (22) to align two chips. The Examiner correctly states that *Fukano* fails to disclose forming a magnetic layer on a substrate side of a surface mount component as claimed by Applicant.

It is the Examiner's position that one of ordinary skill in the art would include a magnetic layer disposed on the substrate of *Fukano* as taught by *Chan et al.* in order

to provide a magnetic force of sufficient magnitude to hold the surface mount component on the substrate before and during soldering.

First, *Chan et al.* does not disclose the use of a magnetic layer but rather discloses the use of ferromagnetic materials. Specifically, *Chan et al.* discloses to place a ferromagnetic material (19 or 21) near solder so that when alternating currents of opposite planarity are applied to planar coils 23 and 24, the electromagnetic fields inductively heat the ferromagnetic material (19 or 21) to cause the solder in the vicinity of the material to melt. The embodiment of Figure 4, describes incorporating ferromagnetic materials 30 and 31 in the form of spheres embedded within solder balls 32 and 33 (Col. 4, lines 3-8) or using ferromagnetic material to form pads 43 and 44 of package 42. (Col. 5, lines 3-9) It is to be appreciated that a ferromagnetic material is not a magnetic layer. A magnetic layer generates a magnetic field while a ferromagnetic material can become magnetized when it experiences a magnetic field. Accordingly, *Chan et al.* fails to disclose the use of a magnetic layer as claimed by Applicant.

Second, even if *Chan et al.* disclosed the use of a magnetic layer, which it does not, inclusion of such a magnetic layer in the substrate 10 of *Fukano*, as suggested by the Examiner, would be entirely redundant in that *Fukano* already obtains a magnetic attraction between the ferromagnetic material 38 and the magnetized ferromagnetic material 22.

Thirdly, one of ordinary skill in the art looking to improve the alignment system of *Fukano* would not look to *Chan et al.* for direction. *Chan* is not concerned in anyway whatsoever about the magnetic coupling or alignment of parts. *Chan et al.* is directed towards a method of providing localized soldering by inductive heating whereby an electromagnetic field inductively heats a ferromagnetic material to cause solder in the vicinity of the material to melt. It is to be appreciated, as stated in *Chan et al.*, as ferromagnetic materials are heated due to electromagnetic fields being

placed thereon, their magnetic properties degrade. (Col. 3, lines 28-31) Accordingly, combining the teachings of *Chan et al.* with *Fukano* would decrease the ferromagnetic property of layers 22 and 38 of *Fukano* thereby decreasing their magnetic attraction and thereby degrading the performance of the alignment system of *Fukano*. Accordingly, one of ordinary skill of the art would not be inclined to combine the teaching of *Chan et al.* with *Fukano* as suggested by the Examiner.

Accordingly, Applicant respectfully requests removal of U.S.C. 35 § 103(a) rejections of claims 1-10 and 18-30 and seeks an early allowance of these claims.

Pursuant to 37 C.F.R. § 1.136(a)(3), applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. §§ 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

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Michael A. Bernadicou

Reg. No. 35,934

1279 Oakmead Parkway
Sunnyvale, CA 94085-4040
(408) 720-8300